

# Water Quality Standards



## Willamette Basin Mercury Variance Rulemaking – Effectiveness of Treatment

November 1, 2018  
DEQ Headquarters

# Presentation Objectives

- Committee members understand the capability of municipal wastewater treatment technologies to remove mercury.
- Committee members have the opportunity to provide information related to treatment efficiency.



# Threshold questions

- Can point sources treat effluent to meet WQBELs needed to meet the water quality standard, 0.14 ng/l?
- What are typical municipal treatment system effluent levels?



TREATMENT TECHNOLOGY	VOLUME RANGE OF KNOWN USES	TREATMENT ABILITY
Membrane Filtration – Microfiltration (ceramic)	Unknown	Bench scale to 0.92 ng/L
Membrane Filtration – Ultrafiltration (polymer)	Unknown	Bench scale to 0.92 ng/L
Membrane Filtration – Reverse Osmosis	Low volume	Bench scale to 0.92 ng/L
Ion Exchange	0.015 MGD (5-50 GPM)	1 ng/L
Sludge Activation	5-25 MGD	3-50 ng/L
Sludge Activation w/ Nutrient Removal & Filtration	5-25 MGD	1-10 ng/L

# National studies of Hg in municipal effluent

- Washington HDR Study:
  - Secondary treatment – 9 to 66 ng/l
  - Secondary with filters – 2-10 ng/l
- California (2009-2015):
  - Most tertiary plants can treat to less than 4 ng/l
  - 92% of POTWs <12 ng/l as an annual average every year from 2009-2015
  - 61% of POTWs <4 ng/l as an annual average every year from 2009-2015
  - 13% of POTWs <1 ng/l as an annual average every year from 2009-2015
- Minnesota:
  - Average eff. concentration from major POTWs decreased from 3.6 ng/l (2008) to 1.6 ng/l (2017).

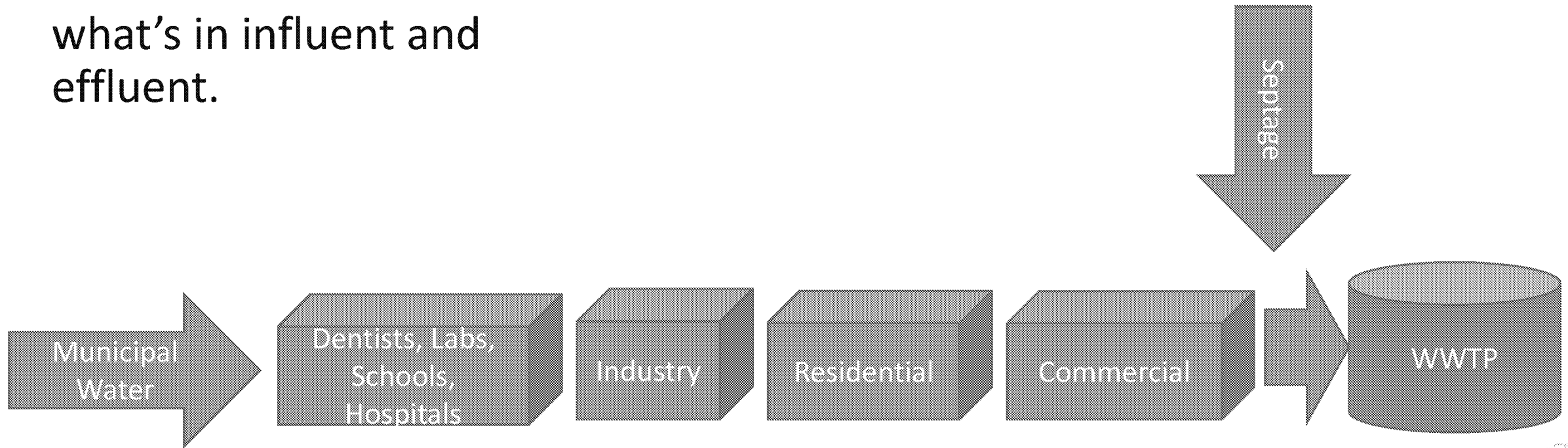
# WWTP Treatment in Oregon

## Pre-treatment data from 2016

Treatment	Avg. influent conc. (ng/l)			Avg. effluent conc. (ng/l)			Avg. % removal		
	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.
Secondary	74.5	172	24	3.1	8.3	1.2	91.8	98.8	83.2
Advanced	75	97	48	1.4	2.2	1.1	97.6	97.0	98.0

# Source Reduction

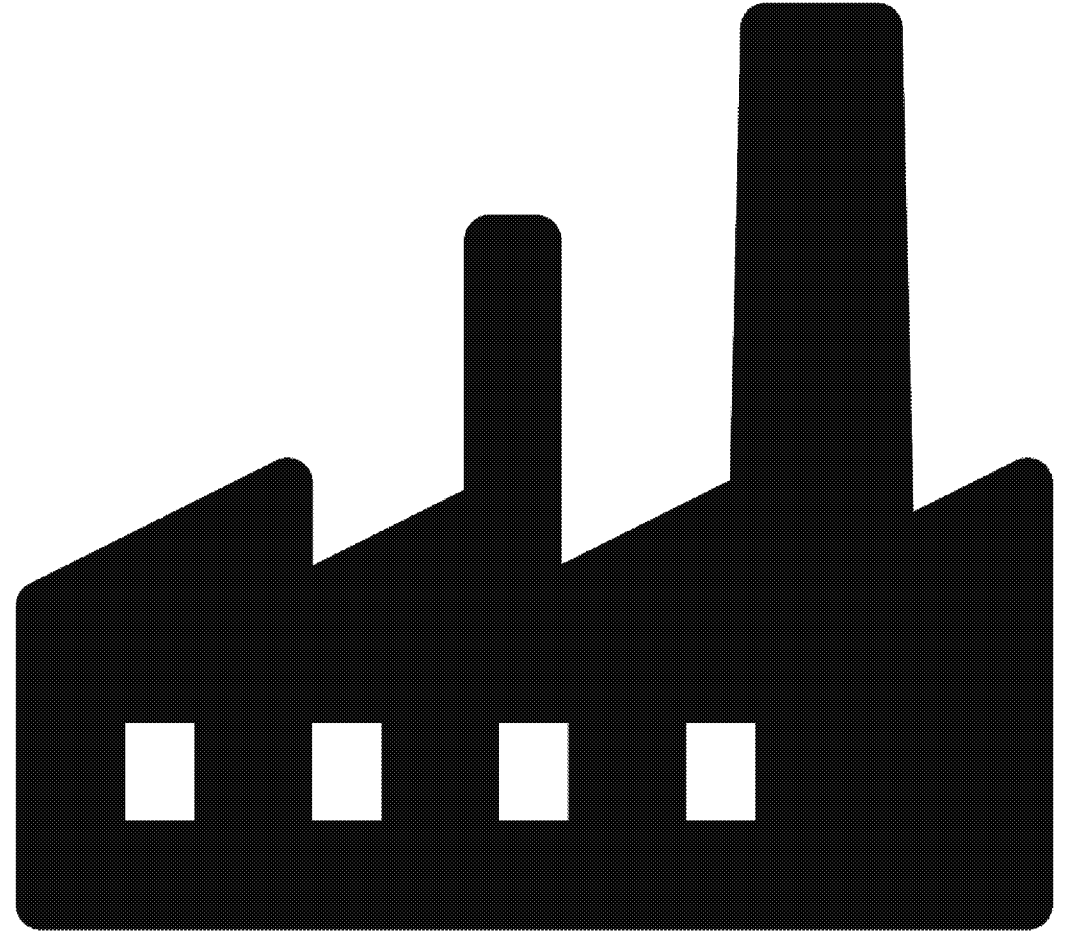
- Source reduction can reduce what's in influent and effluent.



# Industrial sources

DEQ has little data from industrial sources.

Can industrial dischargers provide data that would be relevant to discussion?





# Conclusion

There is no technology that has been used to treat municipal wastewater at a large enough scale that can reliably treat to less than 1 ng/l.

# Questions

